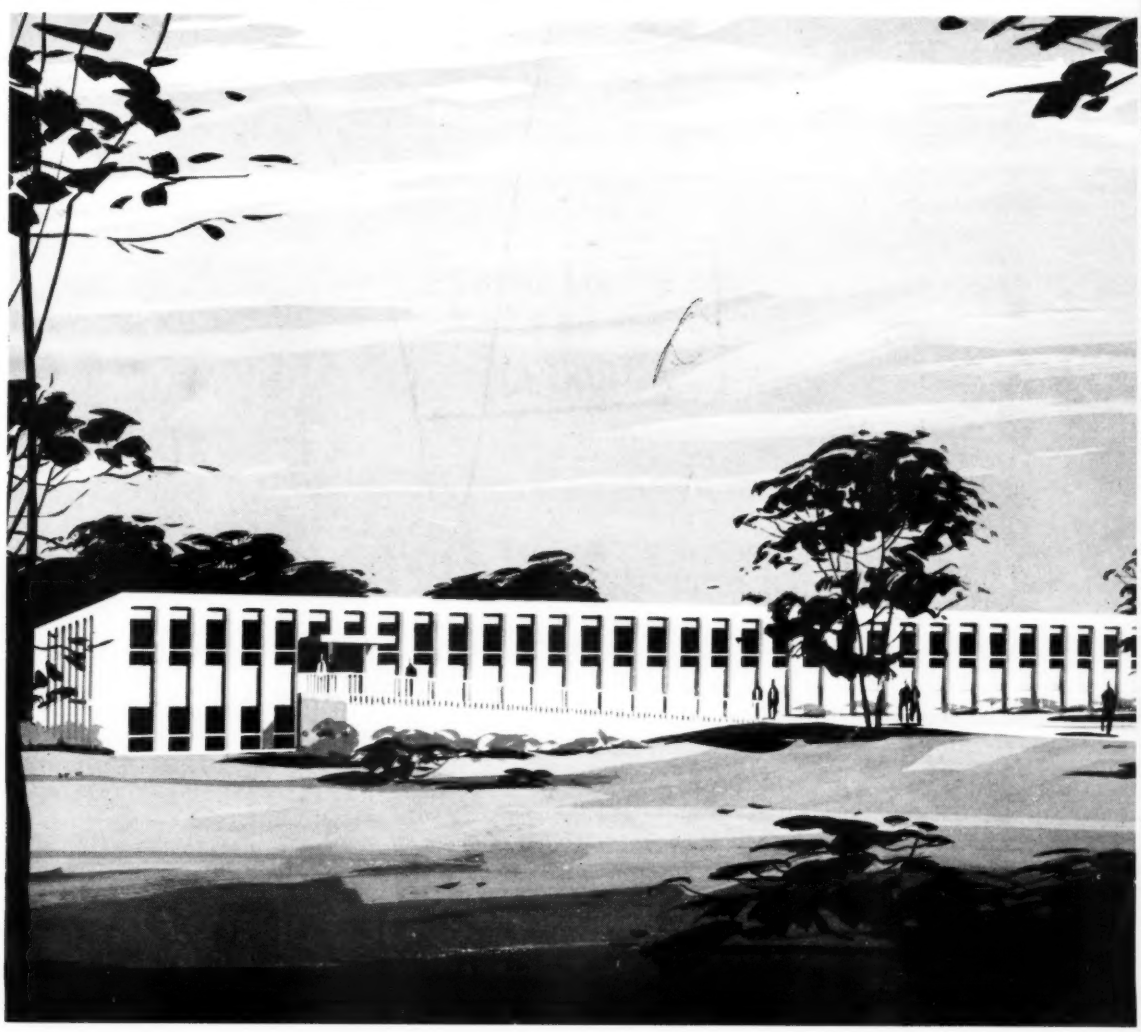
Midwest Engineer

SERVING THE ENGINEERING PROFESSION

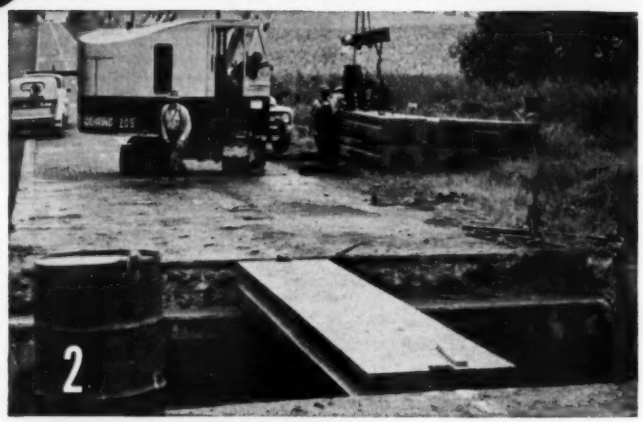


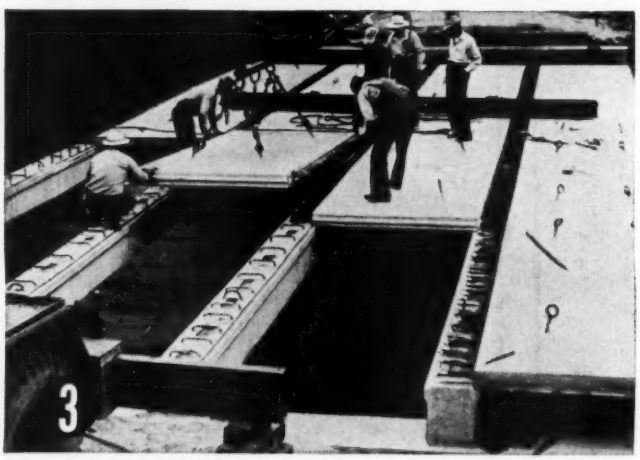
WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

THE CHALLENGE OF AMERICA—PAGE THREE

Vol. 8 MARCH, 1956 No. 10

SAVE TIME AND MONEY WITH *Precast Concrete* BRIDGE UNITS





When building a new bridge or replacing a worn-out one, you can save time and money with precast concrete bridge units.

These photos illustrate the simplicity of bridge building when using precast concrete units.

1. At a central casting yard, precast concrete units are cast side-by-side and thoroughly vibrated to insure strong, dense concrete. A central casting yard facilitates assembly line methods and simplifies quality control. Precasting also saves time and money by eliminating building and stripping of forms on the job site.

2. Units are trucked to the site and usually installed immediately. Photo shows the center slab on a small bridge replacement job in position. Under normal conditions, only one day is required for such jobs. This means busy highways can be reopened to traffic sooner.

3. Precast concrete bridge units can be used on single or multiple spans. Photo shows a 15 ft. x 5¾ ft. x 5½″ precast concrete slab being placed on 30 ft. precast concrete stringers.

4. Photo shows a completed bridge. Precast slabs rest on concrete-capped bents.

Precast concrete bridges can be designed for any width and for any traffic load. They can be used on abutments or piers already in place or on new structures of either square or skew design. In addition to construction economies, precast concrete bridges offer rugged durability, low maintenance and ***low annual cost,*** the only true measure of bridge economy.

For more information about the use of precast concrete bridge units, write for free literature.

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Midwest Engineer

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WESTERN SOCIETY OF ENGINEERS

Serving the Engineering Profession

MARCH, 1956 Vol. 8, No. 10

CONTENTS

COVER STORY

Pictured this issue is an artist's conception of the addition planned for the Science Building of Rosary College, River Forest, Ill. The addition, designed by Naess and Murphy, architects and engineers, will provide space for a lecture hall, laboratories, seminar rooms, and offices for the departments of home economics, geology, and chemistry.

The meeting of March 27

Free Cocktail Hour 5:15 to 6:15 p.m.

Dinner 6:30 to 7:30 p.m.

Coffee Talk

7:30 to 7:45 p.m.

By Admiral D. V. Gallery.

Admiral Gallery is in charge of all reserve officer training for naval aviation, with headquarters at Glenview Air Base here near Chicago. He was in command of the task force which during World War II captured the German submarine U-505 and which now has been brought to Chicago as a museum piece.

Session 1.

8:00 p.m.

"Fiber Glass Poles"

By Philip McLaughlin, field engineer, Line Material Company.

Now the story can be told about the fiber glass utility pole which will frustrate woodpeckers and be impervious to weather, termites, and fungus. Mr. McLaughlin will bring us up to date on this newest member of the pole family. A film showing the pole's progress will supplement a talk which promises to be of vital interest to all concerned, from line designer to pole setter.

Session 2.

8:00 p.m.

"High Tensile Bolts, Rivets, and Stress Concentration"

By L. T. Wyly, research professor of civil engineering, Technological Institute Northwestern University; Dr. J. W. Carter, senior design engineer of structures, Glenn L. Martin Aviation of Baltimore, Maryland; and E. J. Ruble, research engineer, structures, Association of American Railroads, Research Center.

A Triple Barreled Meeting. This distinguished group of engineers will discuss the latest research and developments in connectors and fatigue in structural joints. You are invited to interrupt the speakers to clarify any questions. The talks will be augmented with slides.

Session 3.

8:00 p.m.

"Manufacturers' Report on Gas Air Conditioning"

By A. M. Castello, technical service engineer, The Coleman Co., Inc. and J. O. Yund, chief application engineer, Servel, Inc.

Mr. Castello is a mechanical engineering graduate of Pratt Institute. For the past two years he has been closely identified with the manufacturers' program for research and development in gas powered air conditioning. At present he is engaged in conducting a series of training programs on gas motor air conditioning with utilities who are cooperating with the manufacturers in extensive field testing of the gas motor unit.

Mr. Yund is a mechanical engineering graduate of the University of Illinois. In addition to his duties as Chief Application Engineer for Servel, Inc., he is currently serving on the technical advisory group for heating and air conditioning research of the American Gas Association.

Noon Luncheon Meetings

Don't forget them. They are held regularly on Wednesday, 12:15 noon to 1:15 p.m. See your postcard for speakers.

The Challenge of America

By Roger M. Blough

Your invitation to speak at this mid-winter meeting of the American Institute of Electrical Engineers could not have been more fortunately timed. It arrived one day last summer when a group of us in U. S. Steel were discussing ways and means of finding more good engineers and scientists.

Now I am a great believer in that old Spanish proverb — or is it a Chinese proverb—that if you are going to hunt for quail, it is quite helpful to go where the quail are. And if you can find a large covey of quail, then the hunt is so much the better.

Well, we in U. S. Steel have been hunting more good engineers now for quite a while. I am happy to report that we have been able to bring home quite a few fine specimens who seem to like their new environment. But large coveys of engineers have been mighty scarce for the past several years. You can now understand why I accepted this invitation so readily. Need I go further? Suppose we just say I came because of that comfortable feeling I get from being near so many hundreds of good engineers.

Nevertheless, I do not mind telling you that I was somewhat dismayed, and completely overwhelmed, when I found, in the Encyclopedia Britannica, a description of the qualifications which professional engineers are expected to possess. What, I wondered, could I possibly say to a group with those qualifications? And I am still wondering.

But, nevertheless, I came, for I realized that nearly everything we do—and practically all the conveniences we have —depend for their creation and maintenance upon our engineers and scientists, including, on a rising crescendo of importance, our electrical engineering friends. In our work in the steel industry, for example, we advance when you advance, and our progress is slowed when your progress is halting. And I'm sure that applies to all industry.

This dependence upon you and the others in kindred engineering and scientific fields is a very real and conscious thing. In more ways than we readily realize, it is upon you whom we rely not only for our progress but for our protection.

There is more truth than fiction in the story of the devoted old lady who began her morning prayers with these words: "Give us this day our daily bread—and enough engineers and scientists to keep us alive until tomorrow."

When, therefore, in this atomic age and the present state of world affairs, we are told that our overseas antagonists are out-distancing us in the development of young engineers and scientists, it is a matter of deep concern among many thoughtful Americans.

That concern is more than a feeling of academic pride or a fear that Americans will "lose face" if others move faster and farther in this vital field of education. It is more properly described as a feeling of impelling necessity—of basic protection—of an inward alertness akin to the adrenal-linked reaction of a cat's tail when it senses danger.

Specifically, we are told that more and more technical people are being trained each year in Russia, and that in 1954 the Soviet Union's more than 200 engineering schools and universities graduated some 53,000 engineers. In 1950—a high year—the United States schools graduated more than 50,000, but only about 20,000 in 1954, "although the latter (1954) was a low year."

We also know that the material rewards for engineers and scientists are near the top in the Soviet system. Moreover, the education a young engineer in Russia receives in mathematics and science is good—in many respects comparable to our own — however deficient that education may be on the side of liberal arts.

It has also been pointed out that it is a dangerous self-delusion to suppose that Russians individually can never match our people in scientific initiative and skill. Their first rank men are believed by many to be comparable to our own.

Now progress in education, wherever it appears on the face of the globe, must eventually be a plus factor for mankind generally, and we in America are for it. What gives us pause is the potential for harm of unbridled engineering skill and the use of scientific knowledge for aggression. We are concerned for that type of power which is unbalanced by political restraint and lack of high human standards. And that power is growing.

Whether we like the fact or not, we know the Soviet Union is the second largest steel producer in the world. It has moved forward rapidly from a production of about 20 million tons of steel ingots in 1940 to more than 49 million tons in 1955—a gain in annual production of at least 29 million tons in fifteen years. I should hasten to say, however, that in the same fifteen years, steel production in the United States moved from 67 million tons to 117 million, a gain of 50 million; and we believe our steel-making capacity will be increased by another 15 million tons during the next three years. That gain of 50 million is, of course, almost double the production gain of the Soviet Union, even though their capacity grew percentagewise at a somewhat faster pace than ours.

We also know the Soviet Union has been successful in developing nuclear fission and the hydrogen bomb, as well as air power of a high order. All of these developments require advanced engineering and scientific skills. All are concrete evidence that the Soviets long-term bet on technical education is beginning to pay off.

Certainly we must agree then that it would be foolish to underestimate the capabilities of tyranny and dictatorship for conquest and destruction. That sys-

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This address by Mr. Blough, chairman of the board, United States Steel Company, was presented before the Winter General Meeting of the American Institute of Electrical Engineers in New York, on Jan. 30, 1956.

tem in ancient Sparta overwhelmed a Democratic Athens.

But while recognizing this deep-seated concern, these comparisons do not imply that the United States, with its economy of private ownership and operation, is falling behind Russia, with its government-controlled and directed economy.

I am not willing to endorse any such inference. All my experience and observations lead me to believe that our competitive economy is vastly more productive and progressive than any rigidly controlled economy in producing qualified engineers and scientists, or in producing steel or anything else.

That American way has faced problems before—problems fully as difficult for the earlier periods in our nation's history as those which we now face are for us. And we in America have always risen to the challenge.

Before we rush for the hurricane cellar, let's first get a perspective on just what the problem of this shortage of engineers and scientists really is.

I happen to believe that this shortage, although perhaps partially due to the low birth rate of the early thirties, is principally the result of a free and expanding economy. The shortage was not primarily created because of any threat of communism. Even if Russia suddenly became peaceful, our economy would still need many more engineers and scientists than it has. Thus, too much emphasis on comparisons of annual graduates in the engineering field could easily obscure not only the cause of the problem and its proper solution, but the great need for technically trained individuals to further the peacetime—and I emphasize peacetime — objectives of our nation.

I also happen to believe that instead of this being an isolated problem, this shortage of well-trained engineers and scientists is symptomatic of growing shortages of adequate manpower in other fields of endeavor in the United States. It is rapidly becoming harder to single out one area of our industrial world or one form of human endeavor where the manpower need is greatest. Looking ahead, say for 25 years, the supply of skilled manpower seems to become less and less adequate. Yet it is certainly clear that the rapidity and the character of our progress depends on well trained, highly-principled manpower.

And I also believe that our problem of securing and training the needed engineers and scientists is already partially on its way to a proper solution—a solution found within the tested American process of responsible persons doing their own thinking and acting in a competitive economy. That is our tradition and that is our great strength.

We can, I believe, easily fall into a way of unhappily describing as a major defect of our system, what is only a momentary problem, thereby leaving a completely erroneous impression.

There is a good lesson in the story of the captain who was astounded one night to see his non-drinking first mate stagger back from shore-leave as high as a kite. The captain duly wrote in the log: "Tonight, the mate was drunk."

The next morning, the mate pleaded with his captain to erase the entry because it was the first time he had ever taken a drink in his life, and it didn't seem right to put a black mark on his

record for just one momentary slip. But the captain was adamant.

The next night, the mate was on watch when the captain returned from a quiet evening at home with his family. The captain hadn't touched a drop. So the mate wrote in the log: "Tonight, the captain was sober."

Now as Al Smith would say, let's look at the record—beginning with the early settlers of America I am sure it won't surprise you to learn that there wasn't even one electrical engineer among the settlers at Jamestown and Plymouth. But there was among those courageous immigrants an attitude and spirit that insured the rise of a mighty civilization. There was a willingness to accept the responsibilities of freedom—which is the challenge of America.

More than one hundred years later, Benjamin Franklin, who is probably entitled to be called America's first electrical engineer, began his "kite and key" experiments. Mr. Franklin, whose 250th anniversary is being celebrated this month, is the gentleman who sagely observed that in any difference of opinion between husbands and wives, the "wives are in the right." I'm sure everyone here today will accept that as an accurate description of nature's phenomena on at least an equal footing with Boyle's law.

Throughout his life, Benjamin Franklin met the challenge of personal responsibility to himself and his fellow-countrymen, the challenge of the voluntary response to difficult situations that tried men's souls—the challenge of America.

More than a hundred years after those early experiments with lightning, Mr. Franklin's electricity was encased by Thomas Edison in a bulb to light our homes. The "Wizard of Menlo Park" also met the challenge of his day in the traditional American way—as did Steinmetz, DeForest, and other similar giants of the early development of our electrical industry.

Those scientists understood that there can be no progress without challenge. They were men of vision who knew that there are no limits to man's material and spiritual development as long as he is free to dream and to draft his own individual blueprint and try to build according to that personal blueprint.

In the light of our history and of our tenets, what then do we do about our problem of engineering and scientific shortages? Do we run to Washington to cry about it there and ask the government to solve our problems for us? Do we ask some government agency to tell us how many scientists and engineers we shall need next year and every year thereafter? And do we then compel—in the Russian way—a certain percentage of our youth to study engineering in our high schools and colleges? Fortunately, we do not. Nor would it help us greatly if we did, I think.

It may interest you to recall, for example, that in 1949 the department of labor in its "Employment Outlook For Engineers" gazed into its cloudy crystal ball and came up with this depressing glimpse of the future:

"In the next few years," said this department of labor report, "the number of graduates will greatly exceed the demand for graduate engineers . . . schools could admit even fewer students and still provide an adequate supply of engineering personnel."

(Continued on Page 10)

U. of Mo. Celebrates Centennial

The College of Engineering of the University of Missouri formally launched its centennial celebration Feb. 8 with publication of a special bulletin, "One Hundred Years Ago," which gave a brief history of the teaching of engineering there for the past century. Most of the centennial activities were centered in Engineering Week of March 11.

With an interesting but brief account of University campus life before and after the Civil War, the bulletin presented excerpts from the University's annual catalog for 1856 to show that a professional course in civil engineering was well established there at that time.

The course of study prescribed for the young engineering aspirant of that day was, by the way, far from a "snap," even by today's difficult professional standards.

According to the bulletin, the Board of Curators and the College of Engineering established 1856 as a definite date to observe as the centennial, not only because the official University catalog of that year listed two students as graduating with degrees in civil engineering, but also because the Board of Curators in that year established the first professorship in engineering, naming William A. Hudson, "professor of natural philosophy, astronomy and civil engineering," as well as president of the university.

The centennial bulletin opened with a paragraph containing general information from the catalog of 1856 informing prospective students of the ease with which they could reach Columbia. The student traveled by steamboat on the Missouri River to Providence, about 12 miles southwest, where carriages were "always in readiness to convey the passengers to Columbia over the plank road."

The student of that year found Columbia a thriving community of 1,200 population, the bulletin said, where room, board, washing, fuel, and light could be obtained by the student for $2.50 a week. The University had an enrollment of 112 students, of whom 98 were from Missouri, 6 from Kentucky, 2 from Georgia, 2 from California, and one each from Louisiana, Texas, Arkansas, and Oregon Territory.

The University had a faculty of nine members, including the president, who carried a considerable teaching load, and a Board of Curators of 18 members. There were three buildings: the "University Edifice," a magnificent main building erected at a cost of $85,000; the Observatory, containing an equatorial telescope, a sidereal and solar clock, and several other instruments; and the president's home, which still stands today. The "University Edifice" burned in 1892, leaving only its six columns which are today the landmark and trademark of the University of Missouri.

The prospective student of 1856 was informed by the catalog that his total expenses for the year might be $105, including his tuition fee of $20 and a contingent fee of $1. That publication also warned that there would be no recess given during the scholastic year except from Dec. 24 to Jan. 1 inclusive.

The first official mention of engineering as such was found in the catalog of 1849, the centennial bulletin says, when a course in "civil engineering with the use of instruments" was offered to the senior class together with a sophomore course in "surveying and leveling." Minutes of the Curators meeting in Jan., 1849, show that a resolution was passed for an expenditure of $500 for purchase of apparatus, including especially full

sets of instruments used in Civil Engineering."

The "course of instruction" listed for the civil engineer in the 1856 catalog showed that he was required to take, as a freshman: algebra, Sallust, classical geography, English grammar and Parsing, Virgil, geometry, and Graeca Majora.

During his sophomore year he took logarithms, trigonometry, and mensuration, Livy, Graeca Majora, history, English language, Latin and Greek composition, surveying and leveling, Roman and Grecian antiquities, and Horace.

While a junior he had to pass spherical trigonometry, natural philosophy, Horace, Tacitus, Graeca Majora, logic, rhetoric, philosophy, and Christian Evidences; and as a senior his required subjects included analytical geometry and calculus, astronomy, moral science, Homer's Iliad, Oedipus Tyrannus, Cicero de Oratore, political economy, civil engineering, chemistry, and mineralogy.

It was successful passage of such courses that enabled William Barr and Thomas A. Field, both residents of Boone County, to obtain their degrees as "Civil Engineering Graduates of 1856," the first engineers graduated from the University of Missouri, according to the bulletin.

In the hundred years which have elapsed since then, some 2,300 engineers have graduated from the Columbia division, according to the centennial bulletin. The equipment in the engineering laboratories on the Columbia campus is now valued at more than half a million dollars. The value of the buildings housing engineering on the Columbia campus is more than $1,700,000 and the student enrollment in the College of Engineering now totals 1,300, or more than 12 times the enrollment of the entire university in 1856.

The first piece of equipment purchased for engineering by the University was a theodolite, an instrument with telescope for measuring vertical and horizontal angles, and that instrument is still in the college's laboratories.

Lemont Lab. to Design Military Reactor Plant

The Atomic Energy Commission announced Feb. 16 that the Argonne National Laboratory, Lemont, Ill., has been assigned responsibility for the design and development of a military nuclear reactor plant for production of electricity and for space heating. The Commission and the Laboratory have selected The Pioneer Service and Engineering Company of Chicago to work with the Laboratory on the design of the reactor and the associated plant.

The project calls for the design of a low-power, heterogeneous, boiling reactor, to be known as the Argonne Low-Power Reactor (ALPR). The power plant that is proposed would produce a combined electrical and space heating output of several hundred kilowatts. The reactor will consist of a pressure vessel containing an assemblage of enriched uranium fuel elements and a number of neutron-absorbing control rods submerged in water. The water will circulate through the reactor core by natural convection. Steam produced by the heat created by the fission of uranium atoms will be conducted directly to a turbine-generator.

The ALPR is planned as a prototype of nuclear plants for use in remote areas.

The primary design objectives of the project are simplicity of the system, ease of transportability and construction, reliability, and ease of operation which would hold to a minimum the number of operating personnel required. A further objective is the design of equipment which can operate for extended periods of time without maintenance requirements.

C.T.A. Finds New Use for Mixer

An innovation, which may set a precedent in railway track construction and maintenance, is the Chicago Transit Authority's use of revolving drum, cement-mixer trucks for placing crushed stone ballast in track road beds, according to W. J. McCarter, CTA general manager.

CTA is pioneering the use of trucks of this type in the track construction work it is now doing in the West Side subway in the median strip of the Congress Expressway as a contractor for the City of Chicago.

This is the second time within the last two years that CTA has developed a new use for trucks of this type. In the first instance, it pioneered the use of these trucks as snow fighting equipment, spreading sand and salt, and plowing snow, on streets where CTA operates buses and streetcars.

The trucks, both for track construction work and for snow fighting, are hired from the Materials Service Corporation. Fifty-five of these trucks are being used as CTA operations require—most of them for snowfighting.

"The hiring of these trucks for these special purposes represents further steps by CTA in its continuing program of providing greater overall safety and better service for its patrons. It also increases economy of operation."

In the Congress street expressway median strip, CTA workers have ballasted as much as approximately a half mile of double track per week since the trucks went into service in the vicinity of Pulaski road on January 17. By the time the project is completed, they will have laid down a total of about 18,000 tons of stone in various sections between Laramie avenue and Halsted street.

Use of the huge vehicles in placing the stone results in a saving to CTA of up to 40 cents per ton of material used, or about $7,000 overall. And because of their capacity for dumping large amounts of crushed stone and their maneuverability, CTA expects to speed completion of track-ballasting work.

Each truck can haul, in its revolving hopper, up to 17 and one-half tons of crushed stone. Since it travels easily between the two tracks of the strip, it can dump its load, by means of a chute, right on the track.

Because the ballasting operation is thus made a comparatively simple one, CTA workers can place 300 tons of stone ballast during an eight-hour working day. This amount is more than three times that put down when CTA used its own trucks to dump stone in windrows along the outer edges of the median strip, and employed link belt loaders to move the ballast material onto the tracks. Use of the trucks means that the ballast, which now is dumped into place, picks up less dirt. And because of the absence of piles of stone alongside the tracks, vehicular traffic on the expressway is afforded greater safety.

The big trucks also proved their worth as snow and ice-fighting equipment so convincingly that CTA hired 25 more trucks from Material Service Corporation last October to add to the 25 hired from the same firm the previous October.

But making streets passable and safer during and after a winter storm involves more than just the use of good equipment. It also requires co-ordination of effort on the part of CTA personnel so that these trucks, and CTA's own equipment, can restore conditions to normal quickly. CTA prepares for such action before the bad weather strikes the Chicago area.

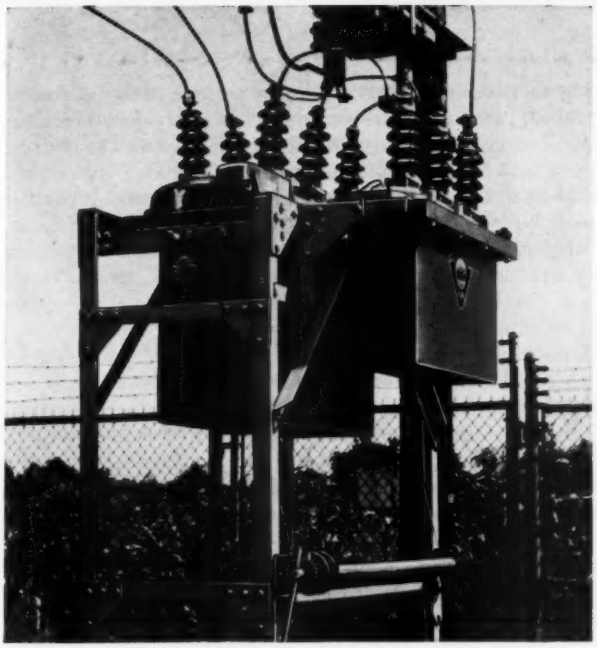
Receiving an alert from weather forecasters that a storm is due, CTA notifies the Material Service Corporation that the hired trucks may be needed. Then CTA's transportation department notifies the supervisors of one or more of the four yards, where the building-supply firm houses the vehicles, when CTA wants to place them in service.

All trucks and drivers (who also are hired from Material Service Corporation) are under the supervision of CTA district superintendents when they are called for work on snow and ice.

A.I.E.E.'s Nominate Coover for President

The nomination of Mervin S. Coover, head of the Electrical Engineering Department, Iowa State College, Ames, Ia., for the 1956-57 presidency of the American Institute of Electrical Engineers, largest society of its kind in the world, was announced in New York on Jan. 30, at the opening general session of the Winter Meeting of the Institute in the Hotel Statler. Nomination of five vice-presidents and three directors was also announced.

The Society's more than 49,000 members will ballot by mail on the nominations and results will be announced at the Summer and Pacific General Meeting of the Institute at San Francisco, June 25.



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- *Dinner- 5:30 p.m.-8 p.m.*

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Challenge of America

(Continued from Page 5)

To what extent this discouraging advice may have contributed to our present shortage of engineers and scientists, no one can say, of course, but clearly Washington is not the answer to our problems. And certainly we cannot — under any circumstances, and regardless of what any other nation may do— attempt to draft immature minds into unwanted careers. This would be the antithesis of freedom's way. It would also be the surest way to dull the sharp edge of youthful competence. It would mean substituting regimentation for consecrated careers. That course is not for us.

Our way is different. It consists of substituting incentive for compulsion and it is the proven, tested way. For, it so happens that freedom's way works— and it is working right now to produce more engineers.

Our economy needs and wants more engineers. As a result, the price of engineers is steadily rising. In our free society, that is the one infallible test of what is most wanted and in what amounts. It is the irrevocable law of supply and demand.

We cannot compare men to corn, for men are people and corn is a commodity. But it is, nevertheless, true in an economic sense that the demand for corn has been satisfied and its price is down, while the demand for engineers is not being satisfied and the price people are willing to pay for engineers and scientific services is going up.

Thus, while corn prices are artificially supported by government, engineers are drawing premium pay from people who are spending their own money for what they want most. Our young people in schools and colleges need only to turn to the want ads to observe the workings of supply and demand in this price system of ours. There were thirty-four columns of opportunities in one metropolitan newspaper alone on a single day recently. The students are beginning to see this system working and to act accordingly.

Thus greater economic recognition is one way in which we are freely solving our shortage problem.

There is another way of relieving this shortage. U. S. Steel, along with other industries, is now trying to develop a program that might be called, "the care, feeding and propagation of engineers."

With its large expansion and facility programs, and its fundamental and applied research programs, U. S. Steel finds it is steadily needing more scientists and engineers at a time when the supply is limited.

So, along with many others, we are increasing the use of electronic machines and equipment to perform some of the routine work of engineers.

There is, for example, much laborious computation involved in engineering a large project, such as a bridge. One complex computor now in operation is capable of saving as much as 10,000 engineering hours on one project. So far as I know, not one of our engineers has endorsed the hoary and fallacious idea that these machines may soon cause mass unemployment among engineers— or, for that matter, among any other group. It takes engineers to create those machines, and it will take many more engineers than we have to create and build the successors to those machines.

We, likewise, have our own program of advanced study conducted by U. S. Steel men for U. S. Steel employees— utilizing text books written by U. S. Steel men who are experts in their respective fields.

Many of our employees are also being trained on the job to become technicians and assistants to engineers. We

are also encouraging and aiding these technicians to become engineers themselves by attending evening classes offered by local colleges and universities. Many of them are doing so.

Thus, both the engineers gain and the non-engineers gain. The whole work force moves forward a notch or two, and that is another way to take care of an ever-increasingly mechanized America.

There is still another way by which our younger minds find an incentive to science and engineering. I refer to the honor and prestige you scientists and engineers now enjoy. Your profession is rapidly becoming glamorous. You are new decreed to be fit subjects for romantic novels and movies.

Now you can brush off the effect of this on younger minds if you wish, but in the pre-teen and early teen-age set this increasing respect may almost be called hero-worship. I am pleased to report that the kids now think you engineers are almost as worthwhile as a cowboy or an indian—not quite, you understand—but almost.

"Junior" is beginning to realize that he'll never be able to "blast off" into outer space and circle the earth without your help and the help of other scientists and engineers like you. Since he wants to use that "space helmet" he got for Christmas, he is in a mood to listen.

So in a manner of speaking, here is a heaven-sent opportunity from outer space for him to learn that it is only through mathematics, physics, chemistry and those other courses in science that he can answer the call which comes to him from out of the blue yonder.

In all seriousness, if our young people think those subjects will give them what they want, they will flock to them regardless of how tough by reputation the courses are. Those youngsters are more than capable of handling any course you can give them in high school. Maybe the main trouble is that you and I are not doing an ingenious enough job explaining the situation to them.

I am not advocating all kinds of ingenuity, but I am advocating that we work at the problem in a constructive way, each in his own field. If we do that, I am satisfied that the answer to this shortage and to all of our other manpower shortages will find their solution.

Our engineering schools are making much headway toward solving it. Even earlier in their lives, at the high school stage, our future engineers are being made aware — through speakers, films, literature and guidance counseling—of the inducements in the engineering field; of the leadership positions in their respective organizations into which many graduates of engineering schools are moving. For example, I am told that the graduates of one large eastern technical college now occupy positions of president or chairman of the board in over 1,500 companies. I know that in our own company a number of the top executive jobs, including the presidency, are occupied by individuals with engineering training.

The American Institute of Electrical Engineers, of course, is also giving this shortage thoughtful and serious attention. Committees are being formed, money is being raised, and plans are being drawn—not only by your association, but by many others. And that work will go on in many ways on many fronts with even greater effort and effectiveness.

We do not do ourselves a good turn by becoming panicky at the idea of the mere numbers of engineers that are being produced in other countries, or by consciously engaging in a technological numbers race. We do ourselves a good turn when we recognize our problem for what it is. It is not the problem of producing more engineers than Russia does. It is the problem of producing as many as we need, not only for our national protection, but above all for our

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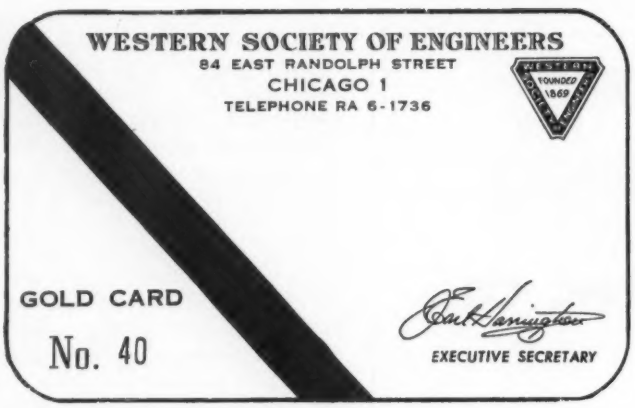

A number of members have asked for this, a service which the Western Society is pleased to furnish.

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national growth. For in balanced growth, in knowledge and human understanding, lies our real—and I believe our only—lasting national protection.

We likewise do our nation a good turn when we move forward toward solving our shortage problems in a hundred individual ways; when we think of quality, competence and the growth of well-rounded individuals; and when we lift by training, upgrading and better opportunities, the whole pattern of standards for all of us in the work force. Then and only then will we be serving our common necessities—and then and only then will we be meeting the challenge of America.

I have one thing more to say.

Somewhere in this day's twilight there is a boy sitting alone. He may be your son or a neighbor's son. He is thinking about his most pressing obligation — what to do with his life, what to make of himself.

Out of nowhere, perhaps, will come the realization that he will find personal growth and confidence and the full life if he can only make a plane that will fly better in the air, or a machine that will run better on rails; or if he can make a device to lessen human drudgery in the home, or build a home so beautiful and so full of human satisfaction that it will excel all that has gone on before.

For this boy, a ship that sails the sea may be the answer, or the answer may lie in the insatiable demands for fuel from under the ground and for power to turn the wheels of industry. Or for him, a deep-seated satisfaction may come from learning and knowing that the unfathomable atom can be harnessed; that the re-alignment of nature's forces to do useful work is only at its beginning and that here he can find great usefulness.

Somewhere today that boy, or his friend—or, in this day, even his sister—and thousands of others like them will hear the sounds of industry, the turbulence of the giant tools of industry everywhere, giants that must be designed and serviced and re-designed and rebuilt. He will hear the rumbles in a steel plant, the ring of glass, the clatter of machines that spin and weave, the whirl of the printing presses, and the roar of the jets. He may even hear the depressing anguished cries of our outworn cities—cities that need new architectural life, that need new modes of human shelter; that need his youth and his groping mind.

Somewhere in that young valiant mind struggling with its grave problem will emerge the image of men of science and men of engineering—men like you —who became what they are, not through compulsion, but of their own free will—not in the expectation of easy riches, but rather in the dedicated hope that their chosen career may afford them at least one fleeting moment of major achievement.

That boy, though he may say little, will see in you, and the others like you, the builders of America. And when he sees that much, every thoughtful boy and every understanding boy will see a little more — something beyond what you have been able to show him. He will see himself grasping your work, building mightily upon what you have built. In what you have pioneered, he will see the great challenge of America for his own work and for his own life.

When he does see, he will eagerly join your clan, mostly because of you. And your clan will thereby be greatly strengthened. You, in your own individual way, will thus have met, remarkably well, the ultimate challenge of personal freedom—the challenge of America.

Good Advice

Do not think to hunt two rabbits with one dog.

— Poor Richard's Almanack

People — not Machines Said to be the Key Automation Essential

The key commodity in any automation program is people—not machines. And to be successful, skilled personnel must bring at least six "tools" to the job.

This was the advice given Feb. 14 to some 200 industrial executives attending an automation conference at Armour Research Foundation of Illinois Institute of Technology in Chicago.

The speaker was Dr. G. A. Nothmann, manager of the Foundation's mechanism and dynamics research department.

Nothmann listed the tools as:

1. Language. The automation engineer should be familiar with the terms of automation technology as a basis for common understanding, and be able to explain their meaning to the uninitiated.

2. Theoretical analysis techniques. The often large capital expenditures entailed in the application of automation emphasizes the need to be able to predict at the drawing board stage what the system will do.

3. Analog techniques for analyzing by means of an electric circuit — before actually building the machine — what a machine will do under certain conditions.

4. Flexible design philosophy to determine ground rules for automation designing as opposed to more conventional design approaches.

5. Experimental techniques, adapted to the machine laboratory to measure the motion of machines at high speed.

6. Measurement and programming—the use of the feedback principle to compare the performance of a machine with the command given it and, when necessary, to correct its operation.

Nothmann pointed out that automation concepts overlap with numerous other fields of technology, and the automation engineer must have a variety of knowledge.

"Today we tell graduating engineering students to pack up all tools they have acquired in college and bring them to the job, for all will be needed in automation engineering design," he said.

The two-day meeting, titled "Automation—A Conference for Executives," was held at the Illinois Tech Commons building at 3200 S. Wabash avenue.

Air Pollution Affects 76 Million

Seventy-six million residents of the United States, approximately 46 per cent of the entire population, are living in areas which have atmospheric pollution, Dr. Lauren B. Hitchcock, president of the Air Pollution Foundation, said Jan. 26.

And solutions for the nation's steadily growing air pollution problem can be produced only as fast as the public acknowledges its seriousness and supplies the money needed to bring the menace of smog under control.

Dr. Hitchcock traced the spread of air pollution in urban centers across the continent at a Pacific Southwest Regional meeting of the American Geophysical Union at Kerckhoff Hall on the UCLA campus.

Far from being an isolated problem characteristic of Los Angeles or such cities as Chicago and New Orleans, he said, air pollution is causing concern in the east as well.

"Of the 76,000,000 residents of United States areas which are experiencing air pollution, 40 per cent live in the six eastern states of Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania," he reported.

Speaking on "Smog—Its Causes and Probable cures," Dr. Hitchcock asserted that unless air pollution is combatted successfully on a nation-wide scale, the cost of smog during the next 25 years "may exceed the total cost of all our wars of the last 50 years."

Cost factors include one billion dollars' worth of unburned gasoline emitted from auto exhausts and adding to smog each year, unreckoned losses of other partially burned fuels, at least one billion dollars a year in smog-caused laundry bills and cleaning of buildings, furnishings and automobiles, and untallied millions of dollars in crop damage, plus corrosion and deterioration of metals and other materials.

"And who would attempt to put a price tag on the health and welfare of our citizens?" Dr. Hitchcock asked. "Who will advocate that we experiment with this generation or the next to determine how much insult man can endure?"

But this is one gamble man does not have to take, he said.

"At the cost of a few millions now, we can effect savings to the country of billions in the years to come, plus far reaching health benefits."

He pointed out that statistics of higher incidence of lung cancer in cities, though not yet proven to be a cause-and-effect relationship, are being taken very seriously by our highest medical authorities.

The Foundation president emphasized that air pollution "parallels the increasing metropolitan concentrations of man and his machines."

He pointed out that "over one-third of the air-polluted population in the United States live in the three metropolitan areas of New York-Northeastern New Jersey, Chicago and Los Angeles," and added that "metropolitan areas along the eastern coast from Boston to Washington, D. C. are fast coalescing into one continuous metropolis."

Air Pollution is now being noted in varying degrees in 30 metropolitan areas of the nation having populations of more than 500,000, and in 71 other centers

of lesser populations, Dr. Hitchcock said.

In addition, reports of atmospheric pollution in Mexico City, Bogota, Sao Paulo, London, Liverpool, Manchester, Paris, Cologne, Copenhagen, Sydney, Melbourne and Tokyo indicate that at least 33,000,000 persons in other parts of the world live in heavily-populated, air-polluted centers.

Dr. Hitchcock warned that "the air supply of any community is fixed by nature, by winds and weather, beyond the control of man," and explained that "a large part of air pollution is the result of our growing requirements for energy in an age of mechanization."

"Nationally, 99 per cent of our energy today comes from the burning of fuel —coal, oil, gasoline and gas. Electricity for our homes, subways and factories comes from the burning of coal, oil or gas, as does our heat for domestic and industrial purposes, and our most popular vehicle, the automobile, derives its power from the burning of gasoline."

Dr. Hitchcock said the Air Pollution Foundation in its first 18 months has spent more than $1,250,000 on basic studies, resulting in a series of 14 technical reports "of which some 10,000 copies have been distributed nation-wide and in 12 foreign countries." He added:

"The Foundation hopes that its efforts and those of cooperating groups will soon make available to regulatory groups sufficient knowledge as to the nature and causes of air pollution, and workable remedies therefor, so that appropriate measures can then be adopted.

"The Foundation is doing everything it knows how to do to hurry up the gathering of the necessary facts, the diagnosis, and the development of remedies.

"But its resources are limited. Additional funds would shorten the time."

A problem not under control of scientists and engineers, Dr. Hitchcock reminded, is "the willingness of the community—which includes business, industry, the public and government — to spend the necessary money and to accept the necessary controls."

Equipment Weight Reduced for Train

One of the various factors contributing to the light weight of *Train X*, the high speed, sleek, low slung passenger carrier now being built for the New York Central Railroad, is the elimination or reduction of heavy electrical equipment, it was reported in New York on Jan. 30. A total of 9,208 pounds per car has been sliced off in this manner, J. L. Swarner, of the Pullman-Standard Car Manufacturing Company, told the Winter General Meeting of the American Institute of Electrical Engineers.

Train X is to have a central electric power source to operate its lighting system, air conditioning and heating system, in contrast to axle driven generators, individual generators and batteries usually found on the conventional passenger car, Swarner said in a paper titled "The Lightweight Train—Its Power Supply and Auxiliaries," presented at a land transportation symposium.

Diesel engine-generated electric power at 440 volts, distributed by an overhead trainline, supplies the train auxiliaries, permitting the elimination of axle driven generators, diesel driven generators for each car, batteries and other conventional electrical equipment, Swarner pointed out.

Sanitary Engineering Board Is Formed

Creation of the American Sanitary Engineering Intersociety Board was announced Feb. 2 in New York by representatives of several major national engineering and public health organizations. They constitute a Joint Committee for the Advancement of Sanitary Engineering.

The new body has been organized and incorporated "to improve the practice, elevate the standards and advance the cause of sanitary engineering; to grant and issue to engineers, duly licensed by law to practice engineering, certificates of special knowledge in sanitary engineering or in any field thereof."

Headquarters has been opened in the Engineering Societies Building, 33 West 39th St., New York City.

The new board has announced that its first step will be development of the certification process. To this end a special committee has been named headed by Raymond J. Faust, executive assistant secretary, American Water Works Association.

Organizers of the Board included representatives of the American Society of Engineering Education, American Society of Civil Engineers, American Public Health Association, American Water Works Association and Federation of Sewage and Industrial Wastes Association. It was announced that incorporation of the board does not alter the program of the Joint Committee for the Advancement of Sanitary Engineering.

Negotiate Argonne Contract Extension

A five year extension of the contract for the operation of Argonne National Laboratory by The University of Chicago is being negotiated, the Chicago Operations Office of the U. S. Atomic Energy Commission announced.

The present contract provided for the operation of Argonne National Laboratory for a four year period running from July 1, 1952 to July 1, 1956.

The University of Chicago has been operator of Argonne National Laboratory and its predecessor organization since the inception of the Government's interest in uranium fission in 1941.

Caribbe Nigh at W S &

The Bi Evenng Fe. 3

Yes, February 3 was a big ght at Engineers. Some of the man peopl vities are shown on these tw pages.

The evening's activities be n at 5 ing of the West Indies Baza . The guests were served tantalizin Haitia ages, or, if they preferred, t e of

The Montego Bay dinner w enjo beginning at 7:00 to the a mpan floor show featuring Calypso ntertai tinued after dinner.

At 9:00 Bob Bacon's movi "Isla ibbean," was shown. If any ing, i his movie shown at WSE a ye earlie that this was the most colorful mo members and their guests were in opinion.

aribbean Night at W S & The Big evening of Fe. 3

a big ght at the Western Society of
e man people who enjoyed the festi-
se two pages.
es been at 5:30 p.m. with the open-
Bazaar. There, members and their
alizing Haitian and Jamaican bever-
ed, those of the United States.
ner we enjoyed in the dining room
he accompaniment of music and a
ypso entertainers. The rhythms con-

movie "Island Hopping in the Car-
anything, it was even better than
a year earlier. Bob himself reported
colorful movie he ever made. The
ests were in full accord with Bob's

Information Handling Is Studied

Evidence of increased awareness by management of the need for improved information services, coupled with emphasis on opportunities for further research and development in the area of documentation, highlighted the Conference on Practical Utilization of Recorded Knowledge held at Western Reserve University Jan. 16-18.

Registration for the conference topped 600, triple the number anticipated in early planning stages. Researchers, top-level management, librarians, editors and others in many fields enrolled. They were from 31 states, the District of Columbia, Canada, Belgium, France, England and Italy.

Co-sponsored by 11 groups, the conference is believed to have brought management and research together for the first time in their study of information handling. This also is considered the largest meeting on the subject ever held outside a regular convention of a professional organization.

Conference proceedings will be published in book form later this year.

Two national groups—the Special Libraries Association and the American Documentation Institute—have expressed a desire to carry on the inter-group exchange of information and ideas, possibly in the form of future conferences.

Representatives of the United Nations Educational, Scientific and Cultural Organization (UNESCO) have indicated an interest in formation of a permanent international group concerned with communication problems.

Conference chairman was Dr. Jesse H. Shera, dean of the School of Library Science at Western Reserve University. Working closely with him were James W. Perry and Allen Kent, director and associate director, respectively, of the Western Reserve Center for Documentation and Communication Research. The Center was established in June, 1955, as an affiliate of the WRU library school.

According to Dean Shera, one of the most valuable phases of the conference was the contribution made toward establishment of a basic philosophy of teaching documentation and librarianship. Western Reserve now is beginning to offer courses in this area on the graduate and doctoral levels.

Three major addresses carried out the main conference theme.

Dr. N. E. Van Stone, vice president of Sherwin-Williams Co., Cleveland, declared the world is on the brink of a revolution in methods of disseminating knowledge. Results will be as widespread as changes in communication have been since invention of the telephone and airplane.

Vice President Ray Dinsmore of Goodyear Tire and Rubber Co., Akron, O., pointed out that the Soviet Union is far ahead of the U. S. in training of scientists and engineers.

"It seems safe to say," Dinsmore revealed, "that the Soviets are graduating about twice the number of engineers and about 50 per cent more combined engineers and scientists than we are at present. Moreover, they are backing these experts with about five times as many graduates from technical schools, which rate somewhat above our technical high school level . . .

"If we cannot equal the efforts of Russia in their mass production of scientists and engineers, we must offset our disadvantage by developing more effective ways for utilization of the knowledge that we have and that which we are now pouring into the record," Dinsmore challenged.

Importance of language clarification was emphasized by Fred P. Peters, vice president of Reinhold Publishing Co., New York.

"Much recorded information fails to inform accurately and effectively because it is only partly comprehensible to the people for whom it was recorded," according to Peters. He called members of the conference, as representatives of a variety of users of documentation techniques, "the only prophets who can lead us out of the 'wilderness of words' in which we so often are lost."

Peters gave credit to the segment of management which has approached the information problem by recognizing three points: processing of recorded information depends on modern techniques and automatic equipment; effective use of this information depends also on intelligibility of communications about it; and professional documentation and literature specialists—"by nature also editors"—can be management's partner in the first two functions.

Many of the latest developments in equipment for information handling and searching were reflected in conference exhibits. From early computors of mathematical problems, machines have been devised to include the fields of accounting and business management, and, as indicated in panel sessions, are being further developed for application to non-numerical data.

All exhibits will become part of the permanent display at the Documentation Center, which moved into quarters in the new $1,600,000 library on the WRU campus early in February.

Psychology vs. Math

Psychologists for the National Advisory Committee for Aeronautics had an important role in solving some very tricky problems that had the group's mathematicians stumped, *Aviation Week* reports. Statistical techniques used by psychologists are able to handle problems that usual mathematics can't touch.

Automation Purpose Is Spelled Out

If automation does nothing else but help stabilize jobs, it will have served its purpose.

Arthur C. Studt, manager of education and training for Hotpoint corporation, Chicago, voiced this opinion Feb. 14 before some 200 industrial executives attending an automation conference in Chicago.

Sponsored by Armour Research Foundation of Illinois Institute of Technology, a two-day meeting on "Automation—A Conference for Executives" was held in the IIT Commons building, 3200 S. Wabash avenue.

Speaking on "Management's Evaluation of Automation," Studt declared, "Automation is America's hope for continuing growth in the future."

Automation will increasingly serve as a general stabilizer of the economy, he said.

"Automation programs require long-range, detailed planning of capital investment," Studt explained, "and the pursuit of these plans regardless of temporary ups and downs is annual sales."

As automation and mechanization are introduced in a company's operations, he added, fixed costs go up.

"With high investments in machinery," he pointed out, "industry has one more incentive to keep those machines running as steadily as possible.

"This provides a great stimulus for better planning, more professional marketing, and all the other techniques for maintaining steady demand and employment."

"When you couple these factors with the simple fact that the nation's appetite for goods in the next decade will rise faster than the number of people available to produce them," Studt continued, "you can see why automation and other technological progress are necessary and beneficial, and that they exert a stimulating and stabilizing effect on our economy."

Entire new industries, employing thousands, are created by the new automation technologies, he added.

Citing the great chemical, petroleum, and electrical industries — among the fastest growing industries in America — he pointed out that they could not exist without mechanization and automation.

"You cannot make chemicals, gasoline, and electricity by hand," he declared. "Advanced techniques make such difficult products possible, and of course create new employment opportunities."

He also pointed to the wave of new employment opportunities that runs in front of automation and technological change—the employment involved in designing, selling, building, and installing the new machinery and controls, along with the new buildings required.

"In addition," he said, "there is additional employment to maintain and service the equipment after it is installed and to sell and service its increased output."

Citing other opportunities for automation aside from those in production, he pointed out that there are wide swings in business today due to inventory accumulation and decumulation.

With the proper systems and machines, the flow of information could be automated, he said.

"Information is simply another 'material' of business," he declared, "and the handling of that information must involve fewer stops and more speed of transmittal."

Referring to the Hotpoint company, he said, "our own efforts in this direction have been increasingly successful in protecting our people's jobs and establishing a stable, growing level of employment and benefits unequalled in the appliance industry."

He added that business has been its own worst enemy. It swings from overproduction to complete shut-down, when, at the same time, retail movement is relatively stable.

"The one segment of business that was always hurt worst was the hourly-paid worker," he declared.

Studt's paper was read at the meeting by Robert J. O'Brien, assistant manager of ARF's mechanism and dynamics research department.

Chicago E.S.P.S. Committee Elects

The Chicago Advisory Committee of the Engineering Societies Personnel Service, Inc. started the 31st year of serving the engineering and scientific professions in the Chicago area by electing officers. The officers elected for 1956 were A. L. R. Sanders, chairman, representing A.S.C.E., R. D. Cooper, vice-chairman, representing A.S.M.E., Dr. A. B. Wilder, treasurer, representing A.S.L.E., and B. H. Allen, secretary representing E.S.P.S., Inc.

Since 1925, the Chicago office of the service has been assisting employers and applicants in the engineering and scientific fields with their placement problems. This is a non-profit corporation, owned and operated by what are commonly called the four founder societies in cooperation with six other prominent national and local engineering Societies. It is recognized as the National Clearing house for engineering and scientific positions.

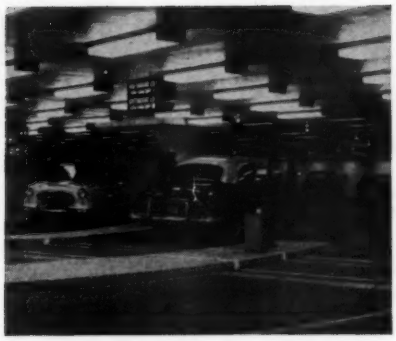
Well, a New Buy

There's a growing rush by oil firms to buy oil wells instead of drilling them, reports *Petroleum Week*. Oil is getting harder to find and drilling costs keep rising.

SAY, ENGINEER!

Do you like to DRIVE?

Then why not drive to WSE meetings and other functions? There's plenty of PARKING almost at the door—the Underground Garage is diagonally across the street from WSE Headquarters (see the map below) and two private garages are a block west.



Interior view of Underground Garage

If you're not driving it's still convenient to get to and from WSE meetings.

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- The IC Suburban station is across the street
- Other suburban stations are conveniently served by bus or elevated.

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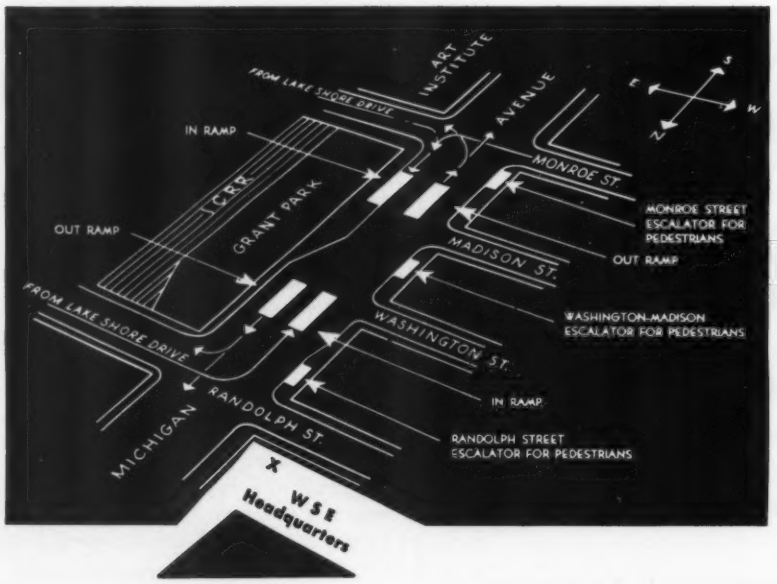
Below: map showing Park Department Underground Garage



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The Moles Honor Two Engineers

The highest honors obtainable in the field of heavy construction were accorded two men—one from New York and one from California—at the annual awards dinner of The Moles attended by some 1,100 leading construction men from all parts of the country on Feb. 2, at the Waldorf-Astoria Hotel in New York.

Howard Langdon King of Port Washington, N. Y. and Harvey Slocum of Alhambra, Cal. became the 16th pair of recipients of the Moles awards, given annually to one member and one non-member, for outstanding achievement and contributions to the art of heavy construction — tunnels, dams, bridge foundations, atomic-energy plants and the like.

Benjamin F. Fairless, president of the American Iron and Steel Institute, made the principal address at the dinner. Speaking on "Faith, Bulldozers, and Progress," he paid tribute to members of The Moles as men who, finding the right combination of faith and bulldozers, do literally "move mountains," and thereby contribute materially to the nation's and the world's aspirations for constantly higher standards of living.

The non-member award presentation to Harvey Slocum was made by Charles D. Riddle of Walsh Construction Company. Slocum has been responsible for the pouring of between 19 and 20 million cubic yards of concrete, in the building of many of the most famous dams in this country, and was in this country on a short leave from his job of supervising construction of Bhakra Dam in India, largest dam in the Far East.

The member award presentation to King, vice president and chief engineer of Mason and Hanger Company, was made by Miles Killmer of that company. King, who was born in New York City, and holds degrees from City College, Columbia University, and Massachusetts Institute of Technology, has distinguished himself particularly in compressed-air subaqueous tunnel work through a long career. He has played an important part in many of the best known underwater and underground routes by which millions of human beings move into and out of and up and down and across the Isle of Manhattan —such as all three tubes of the Lincoln Tunnel, the Brooklyn-Battery Tunnel, and the Holland Tunnel. He also had a hand in the Ray's Hill tunnel on the Pennsylvania Turnpike and the Boston Traffic tunnel, among many others.

King's citation referred to him as "builder, scholar and administrator."

The Moles Awards date back to 1941 and include among its winners former President Herbert Hoover, HMWSE, Robert Moses, Admiral Ben Moreell, the late General Brehon, B. Somervell, Peter Kiewit, and J. Rich Steers.

Among the better-known dams built under the general direction of Harvey Slocum — besides the current Bhakra project — are Lake Hodges, Hetch-Hetchy, Sierra Madre, Grand Coulee, Friant Dam, Davis Dam, and San Gabriel Forks.

Presiding at the banquet was A. Holmes Crimmins, president of The Moles, a fellowship of men who have made their mark in the heavy construction industry. Eugene F. Moran, Jr. of the Moran, Towing Corporation was chairman of the 1956 Awards committee.

Salesmen Like Travel Vacations

Eighty per cent of a representative national sampling of electrical distributor salesmen survey by *Electrical Wholesaling*, McGraw-Hill publication, said they preferred to spend vacations traveling, despite ground covered in their daily sales tours. Most—77.3 per cent—travel by car. Among other personal habits, the majority of salesmen from coast to coast indicated that fishing was their favorite sport.

Shocking Facts

The odds that lightning will strike a building 100 feet square and 50 feet high standing among other buildings is about one in 250 per year, says *Factory Management and Maintenance*. At an isolated location, the probability jumps to one in 17.

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These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated. Prepared ENGINEERS AVAILABLE advertisements limited to 40 words, with typed resume attached may be submitted to ESPS Chicago by member of Western Society of Engineers at no charge.

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C-4512 FIELD & OFFICE Arch. or CE. Age: 30-40. 2 plus yrs. exp. in mfr. or use of concrete block. Duties: Field, office & editorial work in the promotion of concrete blocks for housing. 20% travel. Trade Assoc. Bldg. Mat. Sal: $6500-$7500/yr. Loc: Chicago. Employer will negotiate the fee.

C-4529 SALES — SANITARY EQPT. Age: to 45. 2 plus yrs. exp. in sewage treatment plants. Know: treatment plant operations. Duties: Selling sanitary eqpt. to municipalities & others. Mostly local traveling. Car req'd. For Mfr. of San. eqpt. Sal: $500/mo. & Comm. & exp. (abt. $8-9000 1st yr.) Loc: Chicago. Employer will pay the fee.

C-4530 SALES-PUMPS. Age: to 45. 2 plus yrs. exp. in sales or application of pumps. Know: Sanitary operations helpful. Duties: Selling pumps to industrials and municipalities. Mostly local traveling. Car req'd. For Mfr. of pumps. Sal: $400/mo & Comm. & exp. (Abt. $8000-$10,000 1st yr.) Loc: Chicago. Employer will pay the fee.

C-4536 EXEC. SEC. Eng. Degree. Age: 35-55. Be act. in engrg. societies such as ASCE ASME, prof. license. Authorship of published articles in San field. Able to be an interesting public speaker. mgmt. of society's over all operations of promoting the exclusive use of San. products in the Pacific Coast States, Nevada & Ariz. Sal: $12,000 to $15,000.

C-4553 CHEM. ENGR. PHD., ChE. Age: to 35. 2 plus yrs. exp. in research & dev. in petroleum technology or fluidized solids systems. Duties: process development work in inorganic fluidized solids systems. For Mfr. of steel. Sal: to $900/mo. Loc: Chicago. Salary depends on experience.

C-4566 PLT. SUPT. OR MGR. ME. Age: 30-50. 5 yrs. exp. lab. stainless steel parts. Know: welding, polishing, assembly. Duties: Complete charge of plant operations, fabrication, assembly, welding, polishing, testing, shipping. Should have exp. in dairy or food handling eqpt. bus. Sal: $6-12,000. Loc: Wisconsin. Employer will pay the fee.

C-4587 APPLICATION ENGR. EE or ME. Age: 22-40. Min. 0-2 plus yrs. exp. in test, dev. or appl. Know: electro-mech. control syst. for cont. process operation. Duties: Sales, field & office engrg. Will provide oppor. to obtain exp. if appl. desires. Some trav. No car req. for Mfg. of elect.-mech. controls. Sal: $5-8000. Loc: Ill. Employer will negotiate the fee.

C-4588 DESIGN OR PROJECT ENGR. EE or ME. Age: 22-40. 0-2 yrs. pref. exp. test, development design or application. Know: electro-mech. control systems for continuous process operation. Duties: Opportunity to head up the design & dev. group. Oppor. will be prov. for acq. exp. for appl. who have too little. For a mfg. of elect-mech. controls. Sal: $5500-9000. Loc: Ill. Some traveling. Employer will negotiate the fee.

C-4627 ASST. MGR. PURCHASING. Degree. Age: 40-45. 5 plus yrs. exp. in admin. purchasing for multi plan heavy industry. Duties: Establishing purchasing policies & procedures, organize purchasing functions at hqtrs. level & down thru plant levels; Negot. major contracts & sell surplus supplies & gen. supervise purchasing functions. For a mfr. of Al. & Chem. Sal: $15,000-20,000. Loc: Calif.

If placed in a position as a result of an Engineers Available or Position Available advertisement, applicants agree to pay the established placement fee. These rates are available on request and are sufficient to maintain an effective non-profit personnel service. A weekly bulletin of positions open is available to subscribers. Apply ESPS Chicago.

ENGINEERS AVAILABLE

420 MW TECH. EDITOR. BA. Age: 26. 4 yrs. editing research reports and instr. books. Lady. $100/week. Location: Chicago.

421 MW TRAINING DIRECTOR-SAFETY. Age: 53. 13 yrs. dev. safety training programs for mfgrs., automatic eqpt. & farm implement. 8 yrs. asst. personnel manager for automotive industry. Sal: $9500. Midwest.

422 MW PRODUCTION ENGR. Met. Engr. Age: 31. 5½ yrs. process met. setting up & analyzing conformance to practices required to give sound met. product. $8400. U.S.

423 MW CHEM. ENGR. Ch. E.-B.A. 30. 6 yrs. Chem. Engr. in organic div. supv. in semi-works dept. $6500. U.S.

424 MW SALES MGR. EE 31. 7 yrs. sales research & project work on electronic test eqpt. $9000. Midwest.

425 MW SALES ENGR. Aero. Engr. 32. 4 yrs. sales repr. selling companies services for spec. electronic products. 2 yrs. testing guided missile. 2 yrs. drafts. for tool mfgr. 1¼ selling bldg. materials. $7500. Midwest.

426 MW SALES. MS-Math. 31. 20 mos. organizing & carrying through res. & dev. in electronic field. 6 mos. dev. of high frequency induction welding of non-ferrous metals. $7500. Chicago.

427 MW CH. ENGR. EE 32. 3 yrs. customer contact relative to production appl. in electronic eqpt. 2 yrs. resident engr. charge of insp. for consult. engrs. $7000. Midwest.

428 MW MASTER MECHANIC. 44. 2 yrs. 4 mos. processed various press & spec. mach. & aircraft components. 9 yrs. assigned duties to workers & engrg. dept. with designers of apparatus. 18 mos. Asst. in dev. for mfr. paper containers. $8400. Midwest.

429 MW PRODUCTION ENGR. ME 37. 6 yrs. supv. production of mach. tool requirements, schedules, project assignments. 3 yrs. res. engr. on fuels for engines. 4 yrs. supv. test engineers in evaluating aircraft performances. $7800. Chicago.

CRERAR LIBRARY
News and Notes

Users of the Technology Reading Room will note with pleasure the installation of an electric annunciator board, which signals the arrival of books at the circulation desk. When requesting material, each reader is assigned a "delivery number." Until February, this number was called aloud by the attendant to notify the reader of the availability of his books. The resulting disturbance has always been an annoyance to patrons. The new equipment enables the attendant to flash the delivery numbers on a call board, visible both from the reading room and the card catalog area. Delay in obtaining such a device has been due to commercial estimates of several thousands of dollars for an installation. Final design and manufacture was accomplished by members of the staff at considerable savings.

* * *

The Manager of Research Information Service, Mrs. Ann Henkle, spent February 9 and 10 in Washington with officers of the Department of Commerce and of the Organization for European Economic Cooperation. For several years, RIS was a subcontractor to the Office of Technical Services (Commerce Department) which supplied information services to the Foreign Operations Administration. With other contractors, RIS provided a scientific question-and-answer service; provision of suggested literature purchase lists for visiting teams of experts was the sole responsibility of RIS.

* * *

During 1955, American assistance was directed gradually to non-European countries, as European nations gained in efficiency and productivity. The latter formed the OEEC, and to provide for continuation of the information service a direct contact by that group was negotiated with RIS last September. For other world areas the International Cooperation Administration now obtains from OTS and the various contractors the same services as formerly provided by FOA. Countries for which RIS has gathered information include the Philippines, India, Yugoslavia, Iran, Mexico, Lebanon, Egypt, Korea, Paraguay, Israel, Turkey, Peru, Surinam, and many others.

In providing the answers, it has been necessary to rely heavily on the cooperation of manufacturers and industrial groups. Contacted by letter, telephone, telegram, or in person, companies have shown exceptional willingness to give information and supply copies of their literature. This forms an appendix to the reports submitted to the ICA, which describe the catalogs and brochures in detail. ICA reproduces the reports for distribution to other countries, as well as to that country originating the question (only the latter receives the actual catalogs); each country, in turn, may further reproduce the reports for interested home groups. Thus, information on American products and processes is more widely disseminated than the manufacturers themselves conceive: both the recipients and American industry benefit from the systematic analysis and presentation of industrial know-how.

Steel Exhibition to Attract 200 Companies

More than 200 companies who sell machinery, equipment, processes, supplies and services to the iron and steel industry are beginning to reserve their exhibit spaces for the Iron & Steel Exposition, to be held in the Public Auditorium, Cleveland, Ohio, September 25th to 28th, 1956. Exhibit space has been put on general sale with the recent release of floor plans by the AISE.

The Exposition, the only exhibition directed exclusively to the iron and steel producing industry, provides plant supervisory personnel in management, engineering, operations and maintenance with an opportunity to see, examine and ask questions about the latest developments and technical advances in all departments of the industry. A four-day concurrent schedule of technical meeting supplements the exhibits.

Exhibit spaces are provided with services, such as gas, water, compressed air, drains, alternating and direct current, so that practically every type of machine can be demonstrated.

The Arena area is provided with a hardwood floor, which limits the weight of equipment exhibited in this area to 400 lbs. per sq. in. The Exhibit Hall and North Hall areas have concrete floors, which place no weight limitations on the equipment shown in these areas.

Application blanks and floor plans of the three huge areas—the Arena, the Exhibit Hall and North Hall—are available now from the Association of Iron and Steel Engineers, 1010 Empire Building, Pittsburgh 22, Pa.

Instructor Wanted

COALINGA COLLEGE, Coalinga, California. To teach lower division engineering and geology, beginning September, 1956. Write A. M. Livingston, Director.

Reviews of Technical Books

P. E. Examinations

Professional Engineer's Examination Questions and Answers, by William S. La Londe, Jr., McGraw-Hill Book Company, Inc., New York, N. Y., First Edition, 1956. 462 pages. Price $6.50.

This book was written for the beginner preparing to take his state board examination.

For 20 years the author has prepared or consulted in the preparation of the Professional Engineer and Land Survey license examinations for the state of New Jersey. He is a licensed engineer and the head of the Department of Civil Engineering at Newark College of Engineering.

In this volume he has assembled over 500 problems, mostly taken from examinations given candidates for engineering licenses by state boards throughout the U.S. For every problem there is a detailed answer of the type examiners accept and credit. The book covers all major phases of professional engineering exams. There are problems in basic fundamentals, in land surveying, and in chemical, civil, electrical, mechanical, and structural engineering. There are problems in engineering economics and business relations. The book also supplies supplementary information including a standard of qualifying experience suggested in each of the engineering fields.

J.C.B.

Thermodynamics

Thermodynamics, by John Francis Lee and Francis Weston Sears, Addison-Wesley Publishing Company, Inc., Cambridge 42, Mass. 1955. 543 pages. Price $7.50.

Written primarily for a one-year under-graduate course, this textbook provides a mature approach to the basic principles of thermodynamics for all engineering and applied-science students regardless of their ultimate professional objectives.

Lee and Sears, place emphasis on basic principles rather than on detailed engineering applications in order to encourage a fuller understanding of thermodynamics as a basic science. It is also their aim to develop in the student an orderly process of reasoning from the fundamentals of thermodynamics.

Selection of the subject matter has been in consideration of meeting the needs and interests of undergraduate students in all branches of engineering and applied science. So a single basic course in thermodynamics is offered for all students, instead of a number of specialized courses.

A thorough treatment of the First and Second Laws and their consequences is given in the first seven chapters of the text. The relations among the properties that define the state of ideal and real systems are completely developed. The use of thermodynamic principles is illustrated in chapters eight and nine; it is hoped that an appreciation for some of the limitations of these principles will also be apparent. The thermodynamic approach to various processes, cycles, and reactive and nonreactive systems is delt with in chapters ten through fourteen. The Appendixes include instructions for the use of tables of thermodynamic properties of commonly used substances and appropriate abridged tables; this permits the instructor to introduce this material when it best fulfills the student's need.

John Francis Lee is professor of mechanical engineering at North Carolina State College. He was formerly associated with Stone & Webster Engineering Corporation. He is well-known for thermodynamics and fluid dynamics of flow in turbo-machinery and statistical determination of thermodynamic properties.

Francis Weston Sears has been in the department of physics at M.I.T. for thirty-five years. He is the author of *Principles of Physics*, (1945).

R.G.G.

Structures

Analysis of Structures, by M. Smolira, Ph.D., A.M.I.C.E., Concrete Publications Limited, London, England, First Edition, 1955. 173 pages. Price $4.00.

The explanatory subtitle of this book is "The Analysis of Statically-Indeterminate Structures by the Deformation Method" and it is one of the volumes in the publisher's "Concrete Series."

The deformation method described is applicable to building frames of any shape, in reinforced concrete or steel, and is claimed to be the simplest and quickest yet devised. It is similar to the slope-deflection method, but the equations may be set out more quickly. No sign convention is necessary, moments and forces being assumed to act in the directions necessary to close the angular or linear gaps caused by the relaxation of the continuity of joints. As every operation can be visualized there is little possibility of making mistakes, and there is no need to memorize formulae. There are 60 examples covering nearly every conceivable type of frame and loading, including the effects of changes of temperatures and settlement of supports. Vierendeel trusses are treated in great detail, with examples.

A useful feature is the treatment of beams on a rectangular or diagonal grid, a subject on which little has been published in the English language.

J.C.B.

The Latest Thing— Steam-Heated Roads

The refrain, "Let it snow, let it snow, let it snow!" won't bother motorists entering and leaving the toll plazas on the new Indiana toll road. The road is the first to use snow-melting and de-icing installations at all stop-start and pay areas. Snow-melting facilities will be installed in all twelve plazas stretching across the breadth of the State of Indiana.

Buried four inches beneath the surface of the pavement in all the lanes of the plazas will be a series of steel pipe coils that will heat the pavement and melt the snow.

Boilers located under the toll plazas will supply enough heat to maintain the surface temperature of the pavement above freezing.

The snow-melting units will be automatically controlled from October 15 to March 15. The 200-foot long lanes will be entirely free of ice and snow and will be practically dry at all times because the excess moisture on the pavement will tend to vaporize. This safety feature will help eliminate 90 per cent of all accidents caused by stopping, starting and piling up.

The two largest installations will be made at the eastern and western terminal plazas and each will consist of eight lanes. Eight of the plazas will consist of three lanes, and an east interchange in the city of Gary will be a five-lane plaza, and the interchange at state route 39 near LaPorte, Ind. will consist of four lanes.

The snow-melting installation for the western terminal, located at 121st and Calumet ave., Hammond, Ind., is being fabricated and installed by Petroleum Piping Contractors, Inc., 2041-164th st., Hammond, Ind. The Gary Plumbing and Heating Company, 3955 Harrison st., Gary, Ind. is fabricating and installing the remaining eleven snow-melting installations, including the eastern terminal located 3.9 miles from the Ohio state line.

The Indiana Toll Road Commission, under the chairmanship of Dr. Dillon Geiger, has taken the leadership in providing snow-melting facilities in areas where motorists are required to come to safe, sure stops after driving at superhighway speeds.

All piping material for the snow-melting system was supplied by National Tube Division of United States Steel Corporation.

Lubrication Engineers To Meet in Pittsburgh

A panel session, 48 technical papers, and a concurrent Lubrication Engineering course will comprise the 22 Technical sessions at the 11th Annual Meeting & Exhibit of the Society of Lubrication Engineers, April 4-6 at the William Penn Hotel, Pittsburgh, Pa.

The technical sessions scheduled for April 4 include Spray Application of Lubricants, General Automotive Session, Studies in Viscosity I, Properties of Lubricants, Industrial Gear Lubrication, Fundamentals of Fluid-Film Lubrication, and Fundamentals of Boundary Lubrication.

Scheduled for April 5, are sessions covering Studies in Viscosity II, Effects of Environmental Factors on the Lubricant, Railroad Journal Bearings, Lubricants—Educational Session, Hydrodynamic Bearings, Fire Resistant Fluids Today—Panel Session, Metalworking Lubricants, and Application of Lubricants—Educational Session.

The April 6, Session schedule includes Rolling Contact Bearings, Disposal of Waste Lubricants and Coolants with Reference to Stream Pollution, Boundary Lubrication, Rolling Contact Bearings, Seals, and Gears—Educational Session, Surface Phenomena in Lubrication, Maintenance—General Industries Session, and Plant Lubrication—Educational Session.

Non-members of the Society are invited to register and participate in the scientific and educational sessions of the meeting. A special program of guided tours has been arranged for the ladies including a tour of the Jones & Laughlin Steel Mill.

Complete program and registration information can be obtained from the administrative secretary, American Society of Lubrication Engineers, 84 E. Randolph St., Chicago 1, Ill.

WSE Personals

Raymond D. Berry, MWSE, of Gallaher & Speck, heating, piping and elevator contractors, has been unanimously reelected president of the Building Construction Employers' Association of Chicago, Inc. (BCEA). Also reelected were the four vice-presidents, Fred O. Rippel, S. Austin Pope, Royal L. Brockob and Louis L. Narowetz. Arthur H. Wells, MWSE, was named as treasurer of the association which maintains headquarters at 228 North La Salle Street, Chicago. H. Mayne Stanton is executive secretary.

Under Berry's leadership the membership of the BCEA has grown to a point where it is now the largest in the organization's history.

The BCEA is a recipient of an outstanding activities award given by the American Trade Association Executives. The citation was given to the BCEA, central organization of the building trades associations in the Chicago area, for its part in developing, in cooperation with the Chicago Building Trades Council, the Joint Conference Board of Chicago and Cook County — Chicagoland's formula for eliminating work stoppages due to jurisdictional disputes. New York City and Boston are the only other cities in which Joint Conference Boards exist.

Management and labor's Joint Conference Board in the Chicago construction industry was established in 1914.

* * *

Theodore W. Van Zelst, MWSE, was a recent visitor at the International Fair in Ciudad Trujillo, Dominican Republic. Van Zelst is president of Soiltest, Inc., Chicago manufacturer of engineering test apparatus. The Dominican Republic Public Works Department displayed a complete soils and concrete laboratory as part of its educational exhibit at the fair. All of the equipment in these laboratories was manufactured and supplied by Soiltest, Inc. After the fair, the equipment in the exhibit will be installed in the new Public Works Laboratory in Ciudad Trujillo.

* * *

George F. Long, MWSE, has been appointed, by Inland Steel Company, assistant manager of sales of reinforcing bars. Long has been connected with the company since 1925, in engineering and sales.

Long was born in Winnipeg (Canada) of Icelandic parents whose ancestors came originally from England, and is an engineering graduate of the University of Manitoba.

* * *

Robert W. Dixon, MWSE, has been appointed vice president and general manager of Eseco Division, H. K. Porter Company, Inc., Joliet, Illinois, it was announced by T. M. Evans, Porter's president. Dixon moves up from position of vice president in charge of engineering. H. K. George has been appointed chief engineer, and B. F. Pfeifer continues as vice president in charge of sales.

Dixon joined Eseco in 1948 after serving in a supervisory position in the switchgear division of General Electric Co. He became vice president in charge of engineering of Eseco in 1952. He is a member of A.I.E.E., in addition to the Western Society of Engineers and is a graduate of Drexel Institute. Mr. George has been with Eseco since 1952 in an engineering capacity, is a member of A.I.E.E., and a graduate of the Carnegie Institute of Technology.

The Eseco Division, previously Electric Service Engineering Co., became a division of H. K. Porter Company, Inc., of Pittsburgh in August, 1955. The company specializes in the design and manufacture of electrical controls for heavy industry, for governmental departments including the armed forces, and for the aircraft industry. Office and plant facilities are located in Joliet and Lockport, Illinois.

* * *

Louis E. Dierks recently retired from active duty with Sauerman Bros., Inc. after 42 years with the company. He was a vice-president and a member of the Board of Directors. Lou's engineering ability coupled with his very practical nature contributed much to the development of Sauerman equipment.

Lou is a life member of the American Society of Civil Engineers and the Chicago Engineers Club. His many trips to all parts of the North American continent and to Europe have made Lou a well known figure in the construction and sand and gravel fields.

Along with his many years of service, Dierks has left his mark at Sauerman Bros., by building scale models of a DragScraper, SlackLine Cableway and TautLine Cableway. These are working models and represent many hours of work by a master craftsman. The miniature machines attract widespread attention whenever they are displayed.

Dierks will remain with Sauerman Bros., Inc. as a consultant.

* * *

Dr. Martin A. Elliott, research professor at Illinois Institute of Technology, has been appointed director of the Institute of Gas Technology, it was announced by Dr. John T. Rettaliata, MWSE, president of both institutions.

Elliott assumed the directorship of the

institute—education and research facility on the nation's gas utility industry—on Feb. 1.

Established in 1941 and maintained by the gas industry, the facility is affiliated with Illinois Tech and is headquartered at the IIT Technology Center on Chicago's near south side.

The gas institute's staff of 60 scientists and technicians provide specialized education for present and future employees of the industry and perform research relating to the production, transmission, distribution, and utilization of natural and manufactured gas.

Dr. Elliott is a gas engineer who has been a professorial staff member of Illinois Tech's mechanical engineering department since 1952.

Previously, from 1934 to 1938, he was assistant to the superintendent of the Baltimore gas utility, and from 1938 until 1952 was associated with the U. S. Bureau of Mines in Pittsburgh where he served, successively, as the principal chemical engineer, assistant chief of the explosives division, and chief of synthetic liquid fuels research.

Dr. Elliott received bachelor and doctor of philosophy degrees in gas engineering from Johns Hopkins university, has done extensive research on the development of diesel engines, the production of synthetic liquid fuels from coal, explosives and ammunition components, and has authored many articles for technical journals. During 1950 he studied the development of synthetic liquid fuel processes and the production of fuel gases in the major European countries.

Currently, Dr. Elliott is a member of the executive committee of the oil and gas power division of the American Society of Mechanical Engineers, chairman of the diesel engine test code committee of the Society of Automotive Engineers, and is active on committees of the Coordinating Research Council of the petroleum and automotive industries.

He has been a consultant to General Motors corporation on combustion and automotive exhaust gases. He was chairman, last year, of the Air Pollution Foundation's panel on diesel exhaust gases in relation to the Los Angeles smog problem, and the Annual American Association for the Advancement of Science conference on coal.

Dr. Elliott is a member of the American Society of Mechanical Engineers, the American Institute of Chemical Engineers, the Society of Automotive Engineers, the American Chemical Society, the Sigma Xi, Tau Beta Pi and Pi Tau Sigma honor societies, and Alpha Tau Omega and Omicron Delta Kappa fraternities.

Currently expanding its educational activities, the Institute of Gas Technology provides home study courses, summer refresher classes, undergraduate and graduate education, and has established a number of scholarships and fellowships in the field of gas engineering.

Last year the IGT staff performed research projects with a dollar volume of more than a half million dollars. It operates a pilot plant, for the testing of gas-making processes on a semi-industrial scale, at the Crawford avenue station of The Peoples Gas Light and Coke company of Chicago.

* * *

Ben Maccabee, MWSE, of Engineering Service Bureau has expanded his activities to include a partnership with Jack Campbell, formerly assistant district engineer of expressways, Illinois Division of Highways, in the Chicago metropolitan area.

The firm will be known as Maccabee, Campbell and Associates, with offices at 173 West Madison Street, Chicago 2, Ill., and will engage in civil engineering work for state, county and municipal governments, and seaway and toll road authorities.

Maccabee will continue to operate Engineering Service Bureau to perform engineering design services for industrial and commercial firms.

* * *

John A. Logan, professor of civil engineering at the Northwestern Technological Institute, has been appointed to the vector control committee of the National Research council.

The 10-man committee advises various federal agencies throughout the United States on public health and sanitation problems involving disease transmission by insects and other carriers of disease-causing micro-organisms.

An authority on health and sanitation, Dr. Logan was on the staff of the Rockefeller foundation in Europe for eight years where he specialized in problems of health and development. He served with the U. S. Army during World War II as a member of the Amazon Valley project established to improve sanitation conditions in that region. A member of the Northwestern University faculty since Sept., 1954, Dr. Logan was keynote speaker last December at a World Health Organization conference in Ibadan, Nigeria.

* * *

A noted British engineer will join the Northwestern Technological Institute faculty for 1956-1957 as visiting professor of civil engineering.

He is Alfred J. S. Pippard, head of the department of civil engineering at Imperial College, University of London, and an authority on aircraft structures, stress analysis, and elasticity.

Dr. Pippard will serve both in teaching and advisory capacities while at Northwestern.

Meaning of Water

The standard of living in the United States means consumption of 1,500 tons of fresh water per year per citizen, *Electrical World* reports.

WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

50-55 Peter R. Mucibabich, Product Designer, International Harvester Co., 26th St. & Western Av.

51-55 Joseph K. Knoerle, President, Joseph K. Knoerle & Associates, Inc., 210 N. Calvert St., Baltimore 2, Md. & 53 W. Jackson Blvd.

52-55 Tor Kolflat, Mechanical Engineer, Sargent & Lundy, 140 S. Dearborn St.

53-55 George C. Harris, Design Engineer, Macdonald Engineering Co., 22 W. Madison St.

54-55 James W. Miller, Supervising Engr., American Bridge Div., U. S. S. Corp., Gary, Ind.

55-55 Thomas R. Shaver (Rein.), Private Practice, Structural Engineer, 53 W. Jackson Blvd.

56-55 Robert J. Twohig, Civil Engineer 2, Water Distr. Div., City-Chicago, 2334 S. Ashland Av.

57-55 John E. Johnston, Engineer, H. W. Lochner, 150 N. Wacker Dr.

58-55 Paul F. Johnson, Squad Boss, A. J. Boynton & Co., 111 N. Wabash Av.

59-55 Harold Olson, Partner, Peco and Associates, 3559 W. Irving Park Blvd.

Future of U. S. Said In Hands of Engineers

The nation's hope for the future rests in the hands of the engineer and scientist, undergraduates of the Northwestern University Technological Institute, Evanston, Ill., were told Feb. 2.

The speaker was Dr. John T. Rettaliata, MWSE, president of Illinois Institute of Technology, Chicago, who warned that the rapidly growing population is using up natural resources at an "appalling rate."

The time has come, he said, when "we must be truly scientific" about the utilization of the earth's resources.

"We must count on the scientist's research and the engineer's ingenuity to be the multipliers of our resources, to point the way out of the profound problems that diminishing resources would lead us into," he added.

He cited a recent U.S. Census bureau projection placing the population of the country at more than 330 million people by the end of the century, approximately twice the present population.

"Were it not for the amazing productivity of industry, the result of American science and technology," Rettaliata said, "one might predict an era of belt-tightening rather than new advances in the standard of living, which most industrial leaders and economists agree is in store for the country."

The growing population, often cited as an indicator of long-term prosperity, must be backed by a strong and expanding technology, he added.

Pointing out that large populations do not in themselves mean prosperity or a high standard of living, Rettaliata said the need for "great technological advances" is emphasized by the fact that the population is growing faster than the labor force.

"We are producing 'mouths to feed' faster than 'working hands,' a condition which will continue for a number of years if birth rates remain near the present level," he explained.

Reviewing the results of American technology, the Illinois Tech president told the future engineers that the United States has "come closer to establishing a classless society than Karl Marx probably ever dreamed actually could be achieved."

He noted that the American people drive 76 per cent of all automobiles of the world, produce 40 per cent of the electricity, and use 58 per cent of the telephones.

"These are just a few items in a vast comparative list," he added.

Rettaliata urged the students to cling to the American ideals of freedom as the foundation from which "the good things of yesterday, today, and tomorrow, have, or will, largely come."

Among principal areas in which recent developments have opened broad opportunities for engineers, he listed electronics, nuclear energy, aerodynamics, and automation.

Obituaries

The Western Society of Engineers has recently been notified of the following deaths:

Harry S. Cutmore, president of Harry S. Cutmore & Associates, Inc., Chicago, died on December 28, 1955. He had become a member of the Western Society of Engineers in 1929. Mr. Cutmore was appointed a chief deputy assessor for Cook County in 1931, holding that post until 1933.

* * *

Harry E. Hershey, a member of the Western Society since 1920 and a life member since 1950, died on December 20, 1955. He had been director of technical publications with Automatic Electric Company in Chicago. Mr. Hershey's book, *Automatic Telephone Practice*, went through seven editions.

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William T. Reeves, a life member of the Western Society of Engineers since 1937, died October 28, 1955. He was retired at the time of his death.

* * *

Wilbur L. Snook, staff assistant with Northern Illinois Gas Company, died November 15, 1955. Mr. Snook had joined the Society in 1926.

* * *

William N. Alderman, architect and engineer, died December 20, 1955. Mr. Alderman had served as a major in the Corps of Engineers in the South Pacific during World War II. He became a member of the Western Society in 1952.

* * *

Joseph Z. Burgee, a partner in the firm of Holabird & Root & Burgee, died January 5, 1956. Mr. Burgee became a member of the Western Society of Engineers in 1947.

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Ervin M. Brown, general commercial personnel supervisor, Illinois Bell Telephone Company, died January 28, 1956. Mr. Brown had been employed by the telephone company for a quarter of a century. He joined the Society in 1945.

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Frank J. Herlihy, president of the Herlihy Mid-Continent Company, died September 30, 1955. He had been a builder in Chicago for over half a century. Many streets, highways, and structures were associated with his name.

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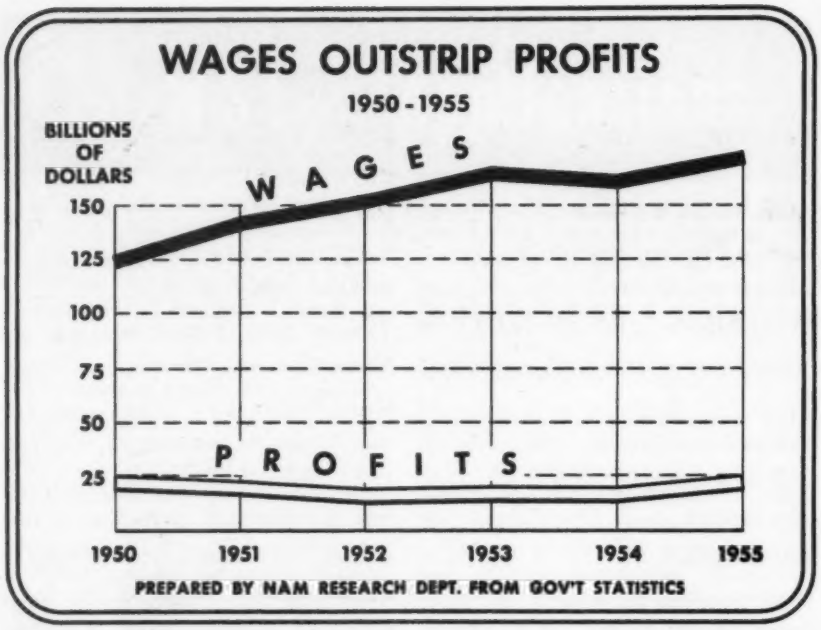

Total wages and salaries, except for government payrolls, climbed to 173 billion dollars in 1955, a 39 per cent increase above those of five years ago when they reached 124 billion dollars, according to a report prepared in Chicago by the National Association of Manufacturers' Research Department from government statistics.

The report stated that this record high level was the result of the greatest number of people working in the highest pay rates in history. Statistics showed that the average hourly wages in manufacturing were 28 per cent higher in 1955 than they were in 1950.

Total corporate profits for the comparative period were about the same. In 1950 profits were 22.1 billion dollars, somewhat higher than the 21.8 billion estimated for 1955. The report concluded that despite the greatest production and sales year ever, a larger number of corporations earned no more than they did five years ago.

Drill Gets Bid

The use of lightweight drilling equipment enabled a contractor to get a highway knifing job through central Wyoming with a bid $60,000 lower than the next nearest bidder, reports *Construction Methods and Equipment*. The method of drilling rock with lightweight jackhammers and carbide tipped drill steel is becoming increasingly popular, and is said to result in higher output, a saving in wages, initial costs, compressed-air consumption and rock-drill upkeep.

Stockpiles to Flower

Ore stockpiles aren't likely candidates for garden club awards. But many may soon be sporting mantles of flowering vegetation if other companies adopt the erosion-curbing system recently discovered by one chemical concern, reports *Chemical Week*. When a load of chrome ore which turned up from South Africa containing seeds of corn and castor beans began to sprout, it was discovered that overgrown piles no longer washed away as did uncovered piles, during heavy rains. The company then investigated other grasses and vegetation. Most effective: the hardy morning glory.

Over 300 Persons Expected at Business Meeting in Milwaukee

More than 300 persons are expected to attend the Annual Business Meeting conducted by the National Screw Machine Products Association for the screw machine products industry. The meeting is scheduled for Milwaukee's Hotel Schroeder, April 4 through 7.

Highlight of the four-day conclave will be a series of nine conference sessions, each chairmaned by experts in their field. Topics to be covered include the perpetuation and passing along of a company (important subjects to producers of screw machine parts because of the vast number that are either partnerships or closely held corporations); problems of estimating screw machine products and the cost involved; production incentives for both direct and indirect labor.

Other conferences will cover such subjects as employee evaluation and internal organization; pension retirement and profit sharing plans; ten-year future planning which will cover the entire gamut of company management as it might be 10 years hence; cost control and financial ratio analysis; modernization and replacement of plant and equipment; and merchandising and marketing analysis.

Program chairman for the meeting is Herbert Lubenow, vice president of the Arthur Lubenow Company, Milwaukee. Roland Herker, vice president and treasurer of Herker Screw Products, Inc., Milwaukee, and NSMPA trustee, is chairman of the business program.


EASTER SEALS
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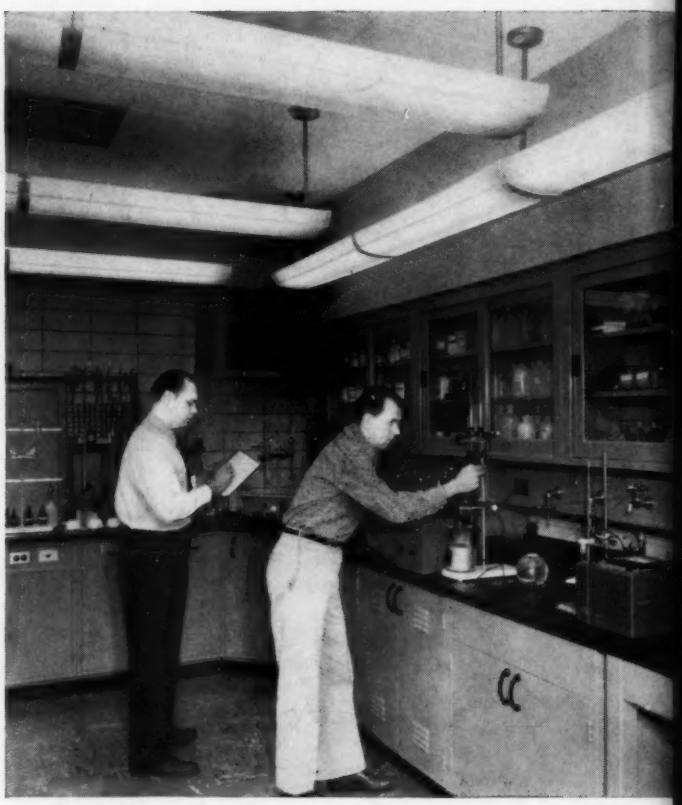
HELP CRIPPLED CHILDREN

Engineering News from Commonwealth Edison

Squeezing extra "juice" from every pound of coal

Efficiency Engineer Bill Guppy and Engineer Don Lusha check performance of a new boiler at Will County Generating Station (Station is still under construction—note safety hats).



Engineers Carl Johnson and George Gordy making a boiler water analysis in our modern laboratory at new Will County Generating Station.

At our 12 generating stations in Chicago and Northern Illinois, the companies' efficiency engineers are constantly checking and rechecking operating techniques. Their object: to get the maximum kilowatt-hours from every pound of coal at the lowest possible cost.

They do this by keeping heat power losses at an economic minimum under varying operating conditions. For example, the problem concerning heat losses from boilers increases in proportion to the fouling of heat transfer surfaces.

Our efficiency engineers continuously make studies to determine how frequently the surfaces should be cleaned. They compare the savings from reduced losses made possible by cleaning versus the cost of cleaning. These studies assist in arriving at cleaning and overhauling schedules which keep costs at a minimum.

In their role as "watch dogs" for our generating stations, the companies' efficiency engineers, together with operating engineers, tackle—and solve—a variety of interesting and complex problems. Right now, with the arrival of Nuclear Power and our Dresden Generating Station, now being designed, our engineers will be faced with even more difficult and exciting challenges.

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